A Graphical User Interface to Facilitate Patient-specific Drug Dosing

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I. INTRODUCTION

The user interface is where carbon-based humans, silicon-based computers, and knowledge-based software meet. In Stead's review of a quarter century of computer-based medical records he identified the foreign nature of man-machine interactions (of which the user-interface is an essential component) as one of the primary limitations to development and use of operational computing systems in healthcare [1].

This abstract (see [2] for a more thorough description) briefly describes the development of a prototype graphical user-interface which is designed to facilitate the process of generating a patient-specific drug dose using one of the existing bayesian-based pharmacokinetic modelling programs (referred to as USC*PACK) [3].

II. DESIGN CONSIDERATIONS

> If an error is possible, someone will make it. The designer must assume that all possible errors will occur and design so as to minimize the chance of the error in the first place, or its effects once it gets made. Errors should be easy to detect, they should have minimal consequences, and, if possible, their effect should be reversible [4].

In The Design of Everyday Things, D.A. Norman presents an approximate psychological model of the seven stages of action required to complete a task. This model helps illustrate just where a good user-interface can have its greatest effect. Clearly, the goal of an easy to use, high-quality user-interface is to simplify the process of reaching the goal.

Key concepts in the design process are to:

1) Provide feedback to the user immediately following the completion of a task.
2) Make as much relevant information as possible visible on the screen.
3) Enable physicians to enter data quickly and accurately and then to see the effects of changes in various parameters instantaneously.
4) Eliminate the possibility of making errors.
5) Translate the therapy goal directly into an action (in this case a pharmacy order).

III. SYSTEM DESCRIPTION

The graphical user interface (GUI) was developed in Visual Basic (Microsoft, Inc.) and runs under the Windows 3.1 (Microsoft, Inc.) operating system. Patient demographic data is stored in a relational database (Access, Microsoft, Inc.). The GUI and the database communicate via dynamic data exchange (DDE) links.

IV. LESSONS LEARNED

Use of Visual Basic 2.0 as our prototyping/ development language greatly facilitated rapid changes to the system. The largely object-oriented nature of the language allows one to easily change the entire look and feel of the system with a few simple changes to the underlying code. The prototype graphical user-interface has allowed us to experiment with different presentation methods, greatly improving the clinical acceptance of the dosing programs.

References

1. Stead WW. A quarter century of computer-based medical records. *MD Comput* 6(2):75-81; 1989.
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